

## I

# STRICTURE OF THE URETHRA\*

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MY thanks are due to you, Sir, and to the Society for the honour you have done me in asking me to address you, but when the Secretary told me what I was to talk about, it made my task easier, because I thought I could bring my personal experiences into a general talk. I want to bring forward a few points which I have learned in dealing with these cases.

One does not see, at the present day, such a severe type of stricture as we were accustomed to seeing in our younger days in hospital work, and there can be no doubt that the reason for that is the better treatment of venereal disease, for which this Society is largely responsible, and the fact that practitioners see those diseases at an earlier stage and carry out infinitely more appropriate treatment, without allowing the patient to drift on until he was obliged to seek expert advice.

We must first get a clear idea of what we mean by stricture, the varieties and the causes of it. We can classify them into congenital, traumatic, and inflammatory. The first two we can dismiss quickly. There are the congenital strictures of early childhood about the meatus or the posterior part of the fossa navicularis, due to errors of development, and the valvular strictures seen occasionally in the posterior urethra, which are responsible for the very dilated ureters and the hydro-nephroses which we see in infant life. As to congenital strictures of the bulb, they are so frequently formed by a valvular portion of mucous membrane with the concavity backwards that it is easy to pass a small catheter or bougie, and you may be deceived and think no narrowing is present. As soon as urine forced from behind comes into contact with it, it bulges forward, and blocks the urethra. It is not a true stricture, it is a congenital malformation of the urethra.

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Traumatic stricture is a more serious problem, because of the length and often the tortuous lumen of the stricture which forms after a severe injury. It usually follows injury to the perineum, either from a kick or falling across a hard object, the force impinging on the pelvis. The pathology is easy to conceive, because the urethral wall may be torn, and there may even be discontinuity between the two ends and much fibrous tissue forms in the process of healing. I well remember a boy, aged seven, with a very long and tortuous stricture, who came periodically to be dilated, and for this he had to have an anæsthetic every time.

Inflammatory stricture is another matter, and I think it is right to say that at least 90 per cent. of these follow gonorrhœal infection. Non-specific, staphylococcal urethritis is seldom followed by stricture, as it is a superficial inflammation. But why should gonorrhœa cause stricture occasionally? We shall probably agree it is not due so much to the gonorrhœa as it is to the treatment which has been adopted for the gonorrhœa. Again it is not the severe gonorrhœa which is followed by stricture, but the slight gonorrhœa, which is often neglected, and is tedious to treat. I am certain I have seen many patients in whose urethra stricture has formed by over-treatment. I am glad to say that that form of treatment, by strong solutions, and the painting of supposed mucous patches, etc., has largely gone. In my early days I saw many cases which had been so treated through an endoscopic tube, with such solutions as nitrate of silver, 30 and even up to 60 grains to the ounce, for supposed mucous patches; these were followed by infiltration of the urethral wall and it led to definite stricture.

The position of the stricture is a matter which has caused much speculation, *i.e.*, as to why some 75 per cent. should occur in the bulbous urethra. And though it has been said that the reason is that the bulbous urethra, being the widest part, inflammatory products are liable to remain in the sac, we must give up that idea, because the urethra is only widely patent during micturition. I think they occur mostly in the bulbous urethra because that is the first part of the curve on which, during ordinary micturition, the urine impinges, and in that way there is kept up, and even exaggerated, the inflammation in the

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bulbous urethra. Stricture occasionally followed syphilis. I have seen several cases of meatal stricture following meatal chancre ; also stricture of the urethra which has been gummatous.

There is nothing very much in the pathology of a stricture, because it is only a normal contraction or cicatrization of scar tissue, and in the urethra, with gonorrhœal infection, there is a deep infiltration extending through the mucous coat of the canal, followed by the formation of fibrous tissue. Again, strictures of the urethra are very frequently multiple. Roughly you get them as ring contractions, as annular contractions, or as fairly long, tortuous thickenings ; and you can take it as a rule that in multiple strictures the tighter stricture is always the more proximal to the bladder. Some say that 40 per cent. of strictures are multiple, but I do not think the proportion is as high as that. In examining with the endoscope, therefore, when one comes upon a fairly wide stricture in the urethra, one must make sure there is not a deeper stricture, of narrower calibre, further back. The lumen of the stricture is not necessarily in the centre of the infiltration. It is frequent to find them eccentric, and, on passing a very fine bougie through, to find that the stricture is fairly long. The name "bridle stricture" is, I think, a misnomer. The band supposed to cross from one side of the urethra to the other is, almost always, formed by the passage of instruments ; there has been a burrowing outside the urethral wall and the so-called bridle stricture is due to the false passage remaining.

The primary effect of any stricture which makes such a difference to the patient is a dilatation of the proximal urethra, and when that is present infection is liable to take place. The severe results we occasionally see are nearly always due to the dilatation and the septic infection of the proximal urethra behind the stricture, and also to infection of the prostate. Proceeding further there may be infection of the epididymes and the bladder, the latter followed by dilatation of the ureters, and then septic infection of the kidney, the so-called "surgical kidney," or better termed the "unsurgical kidney." Infection is the bugbear of every surgeon who has to deal with stricture, and it is dilatation with infection which is the cause of most of the troubles.

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As to the symptoms of stricture, there is little to say. The persistent slight discharge, of which patients complain, should always be followed by a proper examination of the urethra, preferably by an endoscope. The difference in the stream, the text-book description of the twisted stream or the "forked stream" is a misnomer, and it ought not to appear in the books. You have only to think of the mechanics of the ordinary urethra, where the terminal meatal orifice is vertical and the stream of urine coming down is propelled through the vertical opening is almost bound to be twisted. But I do place reliance on the statement by a patient that his stream has not now got the force it used to have. The only difference on the stream during micturition, except lack of force, must be an effect in the terminal urethra, and seeing that 75 per cent. of strictures are in the bulbous urethra, it will be a lack of propelling force, rather than a change in the stream.

The other main complaint of these patients is that he cannot finish off the stream properly; when he thinks he has finished, a few more drops dribble into his clothing. That is an important sign, because it means he is merely emptying the dilated portion of the urethra behind the stricture. The dribbling gives you an idea of how tight the stricture has become, and the amount of dilatation which is happening behind the urethra.

A patient with stricture will not, generally, have increased frequency of micturition, and if a patient has stricture and complains of increased frequency, especially of having to get up at night to pass water, it is almost certainly due to infection spreading behind that stricture; in other words, he has probably got prostatitis or cystitis, or both.

With the stricture becoming tighter, there may be a history of retention, and this may occur even with wide calibre strictures. A patient goes for a motor drive or gets wet; perhaps he has over-indulged in alcohol. With retention you must associate occasionally the incontinence a patient may have from an over-distended bladder. Beware of the patient with an over-distended bladder, whether it is due to stricture or to an enlarged prostate, and regard a patient with over-flow and a distended bladder as being in a very precarious condition. When I was resident at St. Peter's, I had many patients

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sent up with a note from the doctor to say that two or three days before the man had had an over-distended bladder—it was chiefly in the old prostatic patients—which he had relieved by passing a catheter and expressed his joy of drawing off a large quantity of urine, but since then the patient had passed no urine and catheterisation had failed to find any in his bladder. The same retention with overflow may occur with stricture. If you are faced with an over-distended bladder, remember the thing which will bring your patient through without danger is very slow decompression of the bladder.

Now a word on the examination of these patients who have stricture. Many have the idea that the first thing to do with these patients is to pass a bougie or a sound. I think that is about the last thing to do, because it comes into treatment rather than diagnosis. In every case in which you suspect stricture, or if any symptom leads you to think the patient has stricture, it is best to wash out the anterior urethra and directly inspect it with an endoscope, preferably with one which you can dilate with air distension. Distend the urethra and pass your tube down the lumen of the distended canal. In that way you will see whether there is stricture or contraction or infiltration, or any ring constriction, or an actual fibrous narrowing of the lumen. You will also get a very good idea of the size of bougie you can pass in the first stage of the treatment. Remember that strictures are frequently multiple, so that the one you first see is not necessarily the only, or even the narrowest, one in the canal, but with good distension and a good light you can illuminate the canal, and you can probably see a narrower stricture even further down, or a smaller size cannula may be used to pass through the distal stricture. The ordinary canal should not allow air to pass back. Frequently you will find your patient jump a little if you hear a bubble of air go back into the bladder. It simply means that at that part of the canal the lumen is more or less patent, and it is easy to allow a bubble of air to pass into the bladder. So look at it with an endoscope before you start passing bougies. If you decide to examine with bougie or sound, use a flexible bougie rather than a steel sound to start with. And use a large size, a 22 or 24 French scale, or a No. 12 English scale. Pass it with the utmost gentleness, and

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with full aseptic precautions, and note if you encounter obstruction. If you do, decrease the size of the bougie until you find one which just fits the stricture and will go through with gentle pressure. Then you have done enough for that sitting ; you leave the patient alone. When, in four or five days, the patient comes again, you start with that size and then work up a few sizes according to the ease with which the stricture dilates, but do not attempt too much at a time. I do not use steel ones under No. 15 French, as great harm may be done by using smaller sizes in steel. Bougies should be used which taper gradually. Our English makers have not yet learned to make bougies in so good a form as the French makers have ; the latter make a more tapering end, they have a much better surface, and you can boil them. I never use a soft bougie at all unless I boil it. I do not trust formalin or other sterilisation, and I always boil them in silk sheaths, to keep them from touching the bottom of the steriliser. When a patient comes up complaining of difficulty of micturition or a slowing of his stream, never forget to examine his knee jerks. You would be surprised at the number of patients who are sent up as having stricture or prostatic trouble and are found to have early locomotor ataxy or some other form of nerve disease causing a difficulty in emptying the bladder.

The complications can be summed up in a few words : retention, and the outcome of sepsis, which includes peri-urethral abscess, prostatitis, epididymitis, cystitis, pyelonephritis, and extravasation, which latter is nothing more or less than a more acute form of peri-urethral inflammation, and can no longer be considered a true extravasation of urine, but due to infection from anaerobic organisms and spreading in the cellular tissue. And there is, of course, fistula. It is not uncommon to find that the dilated portion of the urethra behind the stricture contains a stone. A stone may originate there, or may have descended from the bladder, and I have removed large calculi from the dilated urethra behind a stricture. I have removed three large ones, one of them composed of two stones, which were faceted almost in the middle. I think these stones have descended into the urethra, and then increased in size very much by the deposition of salts upon them while in this position. They form a

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cast of the urethra and may be impressed by the compressor muscle.

And now as to the treatment of stricture. This will depend not only on the size of the stricture which you are faced with, but on other conditions which may accompany that stricture, *i.e.*, if the patient has a peri-urethral abscess, or fistula, or other conditions which are complicating the stricture.

Taking the stricture first, one's primary object must be dilatation of the stricture. Most of the strictures we see nowadays are not the frightfully difficult, almost impassable strictures we used to see. But I have run across them. I will tell you of a case I saw years ago, through the kindness of Colonel Harrison. It was a gentleman who, through unnatural modesty, had not seen any medical man. He had had a succession of perineal abscesses, which had ruptured, and when he came to Colonel Harrison he had not passed any urine by his urethra for two years. He had seven fistulæ in his perineum, and when he wanted to micturate he had to strain at stool, and pass the urine through a number of fistulous orifices, like water out of the rose of a watering-can. Colonel Harrison and I tried, on several occasions, to pass the finest filiform bougie we could through his urethra, but we failed, and I had to split up his perineum and all his fistulæ, where I could not find anything except dense fibrous tissue between the proximal and distal urethra. I fashioned a urethra in the fibrous tissue, and sewed flaps over an indwelling catheter. I have watched him for eight or ten years, and I can now pass a full-sized steel sound once in every three months.

Fortunately, such cases are not common ; in most instances one can get something through the stricture. You soon learn the kind of stricture which you can dilate. Proceed slowly, never try to do too much at once ; otherwise you will do what you are trying to avoid, namely, causing further inflammatory reaction, which will be followed by more scar tissue formation. If you have a stricture into which you can get only a 5 or 6 French size, be content with that which just fits the stricture, and after four or five days start with the size you left off with and proceed to two larger sizes. When you have got up to No. 18 or 20 French, start with steel sounds, and continue in the same way, giving a week's

interval. I think you should go much higher than used to be taught ; you want to go to at least No. 14 English, or to No. 16 if the meatus will allow it. Pass this size once a fortnight for three months, and then monthly if no recontraction occurs.

Another form of treatment which may be useful, especially in cases in which you can get only small-size bougies in to start with, is to put in a small one and tie it in position ; then in a couple of days you will find you can pass two sizes larger. Then you can take it out and begin intermittent dilatation. Continuous dilatation is apt to set up urethritis, and this may be followed by septic complications, which, of course, is what you try to avoid.

If you are faced with a very tight stricture, even in a patient with retention, and you can get a very fine bougie in, even a filiform, tie it in, and let the patient dribble urine alongside it. That will relieve the retention, and the bladder will be gradually decompressed.

You may ask " Will you cure a stricture in that way ? " No, you will not cure one which has got to such a stage that it must be dilated. You will relieve the patient, and give him a practically normal urethra, provided he will let you pass a sound at intervals, or do so himself. At the end of a month to three months there will hardly be any sign of stricture remaining. But the axiom " once a stricture always a stricture " is very true, though there are exceptions. Whatever form of treatment is applied to stricture, it should be followed by the regular passage of a sound. It may be only once in twelve months, but it is better six-monthly. If a stricture is neglected it will re-contract, and hence the necessity of regular passage of sounds.

It is not always that dilatation will be successful. There are cases in which the stricture is very fibrous and hard, and dilatation is very difficult, even one size at a time, and after four or five days' interval you find you cannot make any " progress." In these cases I would cease attempts at dilatation and do some form of operation. What would lead me to advise operation is the presence of a hard unyielding stricture, and that form of stricture known as resilient, the elastic stricture which seems to dilate fairly readily, but does not retain its dilatation. I prefer to operate on these. There is the stricture which

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bleeds regularly when one attempts dilatation. When bleeding takes place, you cannot go on with the dilatation, you must stop for that day. If he bleeds on the second or the third attempt give up dilatation and do an operation, or advise it.

In cases in which infection is present, the patient comes with a stricture and an infected, dilated, proximal urethra, and perhaps with epididymitis or perineal abscess. These should not be treated by dilatation, but by operation. I had a patient a month ago with a stricture very difficult to dilate. He was known as "The Lone Man of Brazil," and I think he lives 300 miles from any other Englishman or anyone who can pass an instrument on him. He had to get back to Brazil and wanted his stricture dilated. There was not time for efficient dilatation, and so I advised operation as the quickest means of relief, though I am sure that in the absence of regular instrumentation his stricture will recontract.

When you come to advise operation for stricture, what form of operation will you do? I do not think there is any doubt that if you can do an internal urethrotomy you will do better than carrying out any form of external urethrotomy, provided there is neither fistula nor abscess, as it is one of the most successful operations in surgery in skilled hands and gives one of the best results in stricture. But to perform it, the operator must have had some experience of the operation. It is not such a simple procedure as the text-books might lead you to suppose, and you cannot expect to carry it out successfully in every case. I shall confine my remarks in this connection to the Maisonneuve operation, cutting from the distal to the proximal side. It is done by passing a very fine flexible guide through the stricture, and after screwing it on to a steel curved director, you pass the filiform bougie into the bladder, the steel director following on. The special knife is then passed down the director and cuts the stricture. There may be many difficulties in doing urethrotomy. I have failed to pass a guide, I have had a guide break off in the stricture, I have had a guide left in the bladder. You may say that was my own fault, but they are accidents which may happen to anybody. It may not be easy to pass the filiform guide in some of these cases, and if difficulty is experienced I do not remove the first guide, but pass another down the

urethra alongside of it, and if this fails to pass may even insert a third. By gentle manipulation of one of these guides it will often be found that one will pass through the stricture. Another useful tip in these difficult cases is to bend the distal end of the guide so that its point is not in the same straight line as the shaft, and this may pass through an opening which is eccentric. In dividing the stricture do not be content with a small knife, divide it to the 14 to 16 size of knife. After passing a No. 16 steel, pass a full-sized catheter and tie it in for two or three reasons. You are not then so liable to get a rigor and troubles of that sort after the operation if you leave the catheter in. Moreover, the presence of a big catheter prevents the bleeding which may occur after an internal urethrotomy, and bleeding after operation is a serious proposition. With a catheter in, a little pressure on the perineum will arrest the bleeding. The Americans deprecate tying a catheter in after internal urethrotomy, but I do not know why. I leave my catheter in forty-eight hours, washing out the bladder morning and evening, and at the end of forty-eight hours I fill the bladder, take the catheter out, and tell the patient to pass urine, and he is usually very pleased to see that he can pass it in such a full and forcible stream. It gives the patient a confident feeling that he will be able to micturate next time he wants to. I look upon the Teevan and Civiale forms of internal urethrotomy as inferior to the Maison-neuve operation.

Of the other forms of operation for stricture, there is the external urethrotomy, that is to say, dividing the stricture through a perineal incision. The old Syme, done on a director staff, is unnecessary, because if you can pass an instrument as large as a Syme director, you can almost always dilate the stricture, and there is then no necessity to put the patient in bed for three weeks. In the case of an internal urethrotomy your patient can be up in three or four days, and home in a week. The only form of external urethrotomy is the Wheelhouse, in which you open the urethra in front of the stricture, then search for the lumen with a guide and divide the stricture. In that operation it is difficult to find the distal opening in a very tight stricture; and if I have difficulty I cut straight backwards, open the dilated urethra behind, and divide the scar tissue, sewing up flaps over a catheter.

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Another form of operation is the excision or resection of the stricture and joining up the two ends of the urethra, or, what I prefer, uniting the upper wall of the urethra, leaving the inferior part open and have a large-sized catheter passed right through.

I have referred to rigor following any manipulation of the urethra. Rigor may follow even gentle passage of a sound or a bougie, and is more likely to follow internal urethrotomy. Usually it is not of serious import. Put the patient into a hot bath, or surround him with hot bottles and give hot drinks and aspirin, and he will get well. But there is a complication which you must be ready for, and that is a high temperature followed by anuria. Cases of this, however, are uncommon. The first one I had experience of was when I was resident at St. Peter's Hospital, after internal urethrotomy on a man aged twenty-five, who had a sudden high temperature and had complete anuria, and, in spite of decapsulation of his kidneys, he died. We found no lesion of the kidney to account for his anuria. I have seen two cases since then; one, after internal urethrotomy, died with complete anuria, in spite of decapsulation; the other, which I saw with a colleague, followed a simple cystoscopic examination. There was complete anuria and he died. It may happen to any operator; it is like a syncopal attack after passing a bougie or a sound for the first time. Never attempt to pass a sound or a bougie on anybody unless he is lying down, even in hospital practice. I have passed some with the patient standing up, and I have had a man faint and fall forward and sustain a scalp wound in my consulting room. Anuria is a very serious thing to happen, and, in spite of all one can do, it is nearly always fatal.

Now as to the treatment of complications which may arise from a stricture. A peri-urethral abscess must be opened. In the penile urethra it is better to open it through an endoscope tube than from the outside, because the latter is liable to be followed by a fistula. In the perineum open by a free incision and treat the stricture at the same time. Retention in a fairly wide calibre stricture will react by putting the patient into a bath and giving him morphia, and wrap him afterwards in hot blankets and apply hot bottles. Do not pass a catheter if you can help it, or if you do pass one, draw

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the urine off very slowly, especially in a case of old-standing stricture, and in the case of a feeble man who has beginning signs of renal inefficiency.

What do we mean by renal inefficiency? We mean that a patient has renal inefficiency when his kidneys are feeling the stress of back pressure or infection. The first thing you get in such a patient is evidence that such a patient is beginning to lose his tone; he is probably losing weight, has lost his appetite, has a dry tongue, complains of thirst, wants to drink in the night, and perhaps has back-ache. Beware of those patients, and test the renal functions thoroughly before you carry out any manipulation in the urethra. A useful test is that of the blood-urea, and if you find that the blood-urea is above 50 mg. per 100 c.c. you will know that his kidneys are beginning to feel the stress of his back pressure, and any operation you may do on such a patient will be a more serious risk than in a patient whose kidneys are functioning properly.

Another point is, do not rely entirely on the reports obtained from laboratories and on the results of chemical tests for a diagnosis. The present trend of teaching in medical schools seems to be to look for a diagnosis to be made in the laboratory rather than at the bed-side. Renal insufficiency will be obvious to you clinically before you will get a test-tube recognition of it. This tendency I speak of is doing much harm, as the young student feels that on the slightest excuse he can have the diastase reactions and differential blood counts done, without any idea of properly examining the patient. When you think of the old days when physicians and surgeons had to make their diagnosis without these accessory tests, you will realise that accessory tests should remain only as accessory tests; they should not take the place of clinical examination. If you have a patient with acute retention showing signs of renal insufficiency, that patient is in an extremely serious condition unless you can empty his bladder very slowly. In that type of patient you merely want to pass the smallest filiform bougie through the stricture, tie it in, and let him dribble the urine until the bladder is empty; take even forty-eight hours to empty the bladder, as operation at an early stage will be likely to be followed by disaster.